

Measuring Impacts of Urbanization on Urban Travel and Implications for Air Quality: Canadian Case

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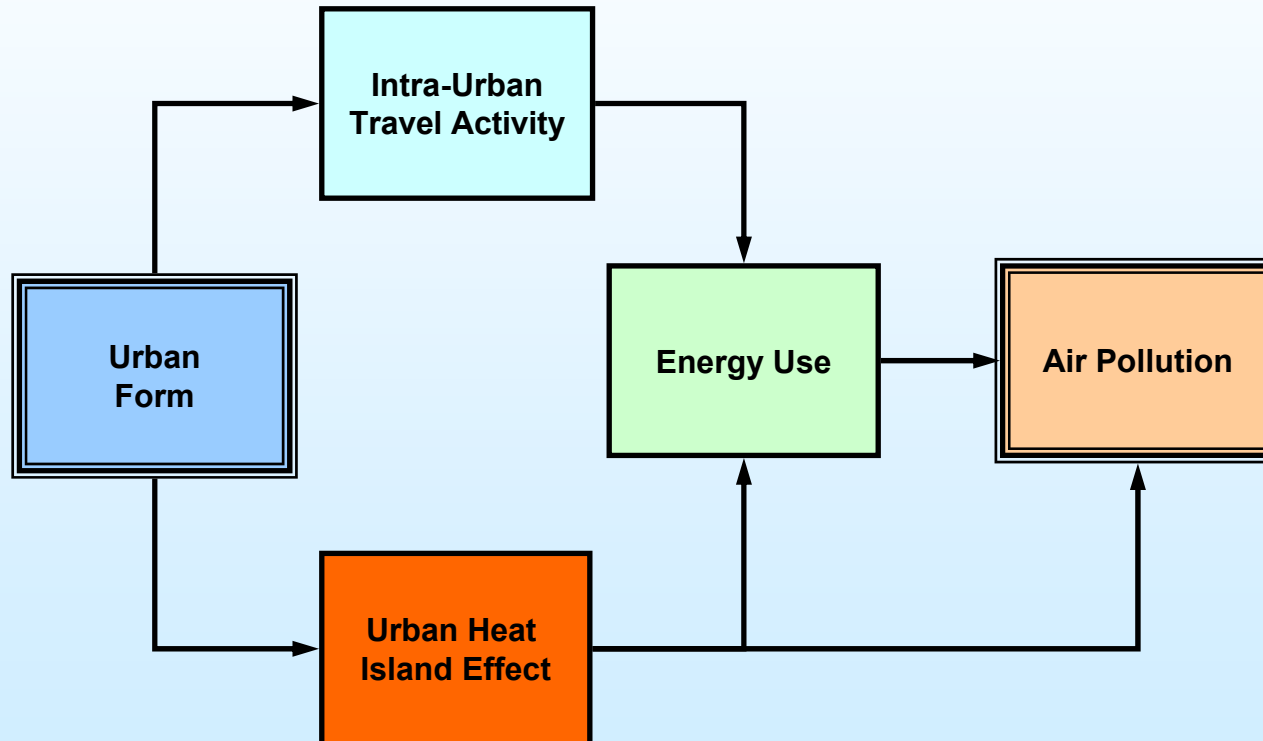
Canada



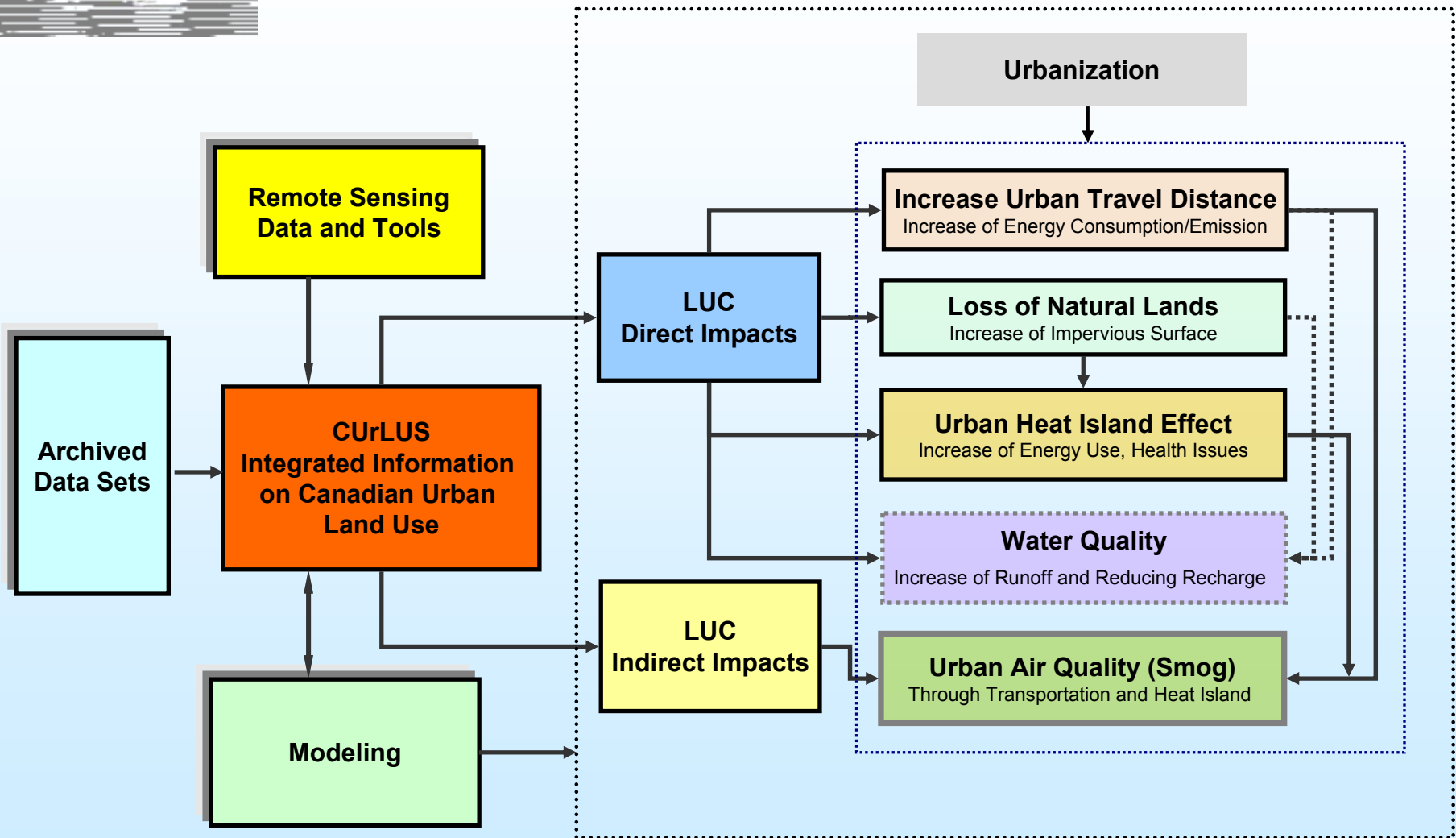
Outline

- The Concept
- Contributions from Earth Observation Data
- The Canadian Urban Land Use Survey (CUrLUS)
- Applications of CUrLUS

Impacts of Urban Land Use on the Atmosphere



EO Contribution to Improve Understanding of Urban Land Use Impacts on the Environment: The Canadian Urban Land Use Survey (CULUS)





The Canadian Urban Land Use Survey (CUrLUS)

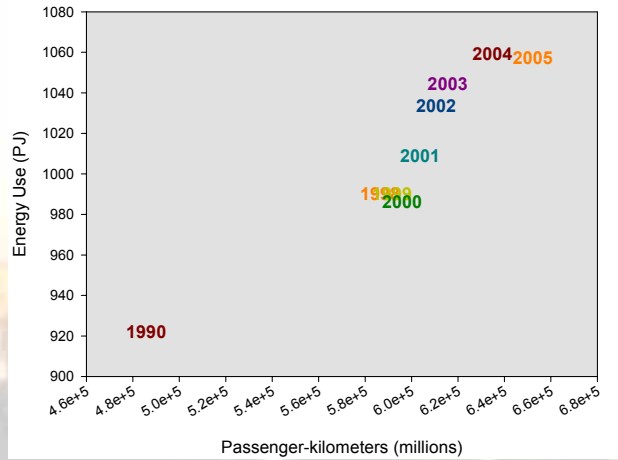
- Nationally consistent source of information on major Canadian cities.
- Built around land-cover & land-use information derived from Landsat Thematic Mapper images.
- Includes integrated information layers deemed necessary to assess urban form impacts on sustainability.

Major Canadian Cities in CUrLUS



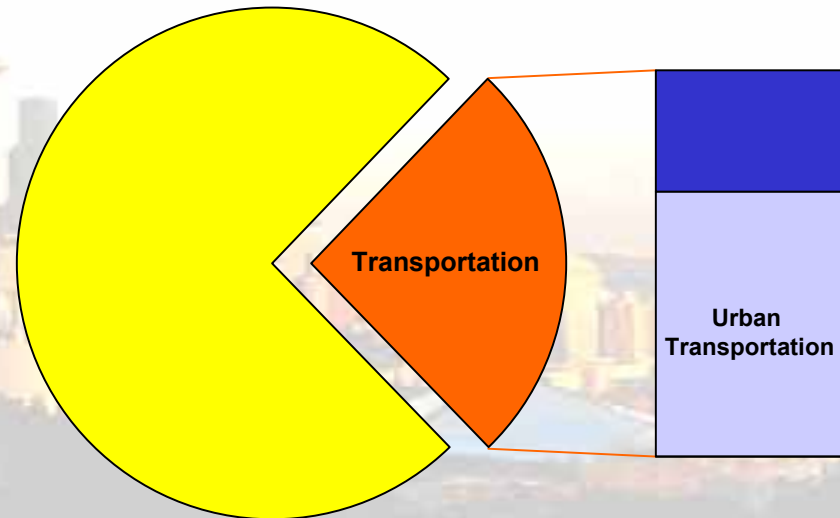
Canadian Urban Transportation I: Energy Consumption and Emission Statistics

Canadian Road Passenger Transportation
Energy Use (Motor Gasoline), 1990-2005



One-quarter of Canada's greenhouse gas emissions come from **Transportation**

Two-thirds of Canadian transportation emissions come from **urban areas**



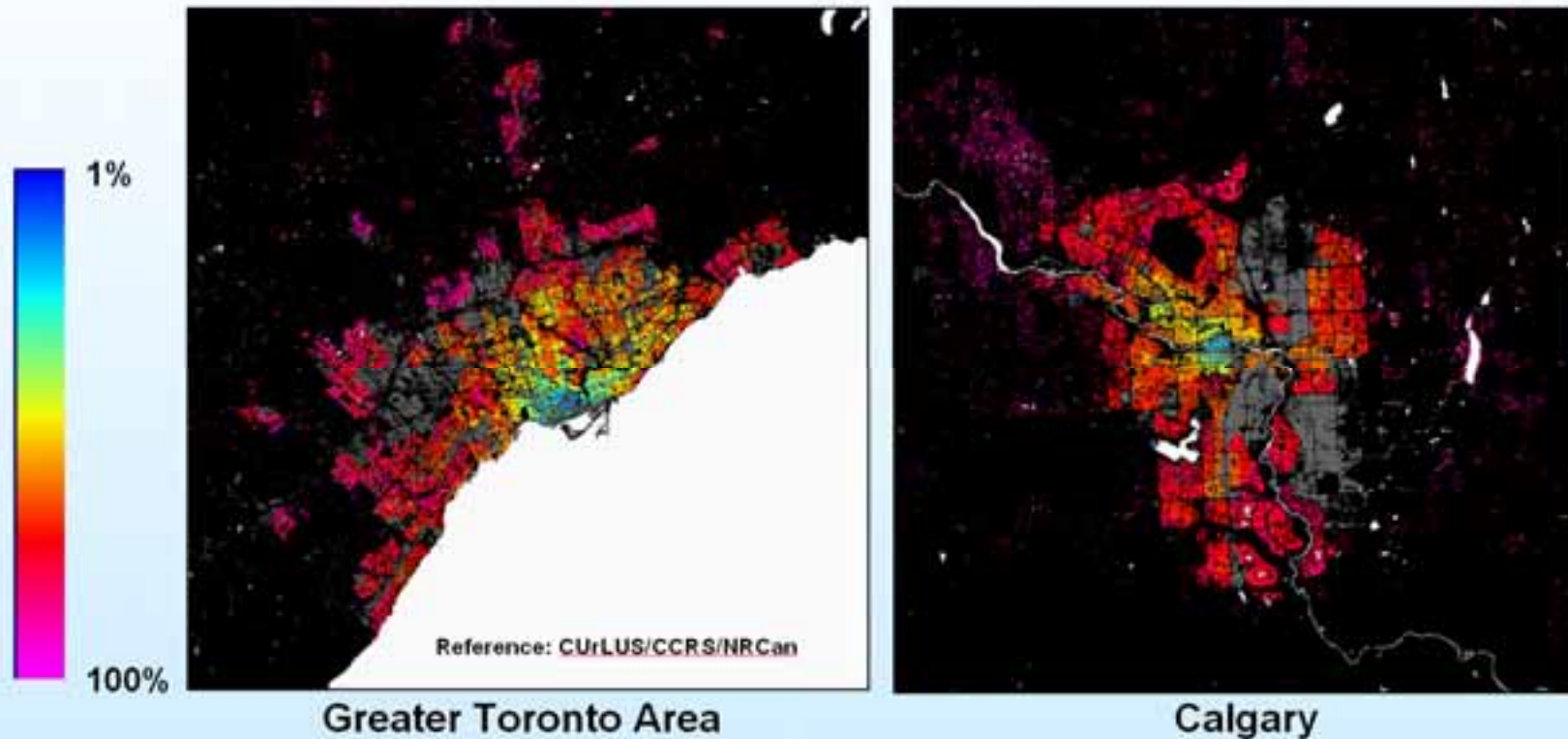
Source: OEE/Natural Resources Canada and Transportation Canada





Canadian Urban Transportation II:

Automobile Dependence and Urban Form



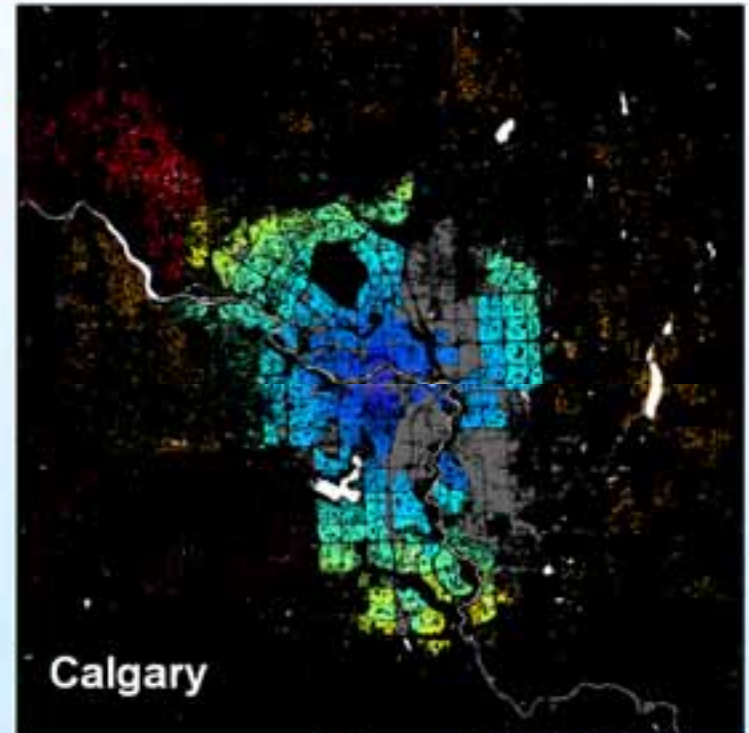
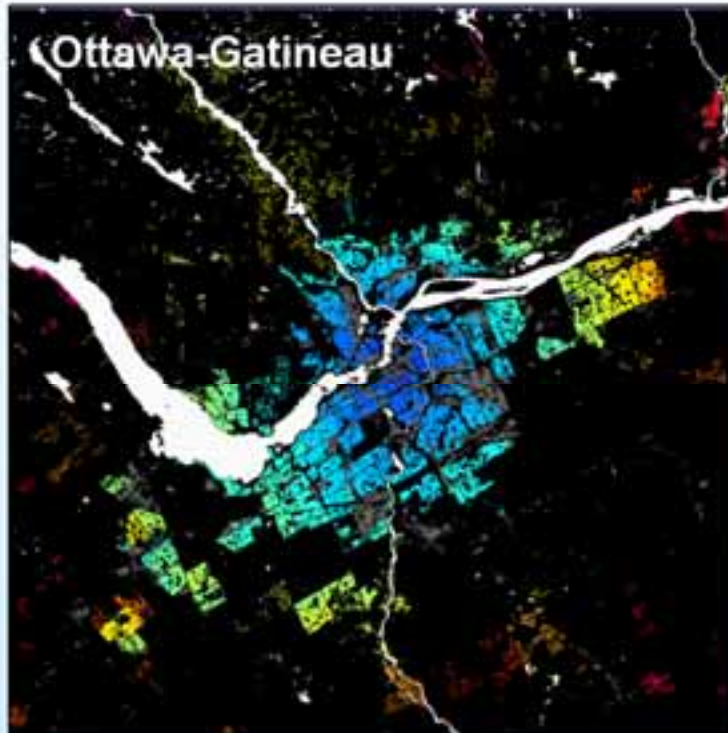
77.4% of Canadians use private vehicles for travel to work

14.8% of Canadians use public transportation for travel to work



Canadian Urban Transportation III:

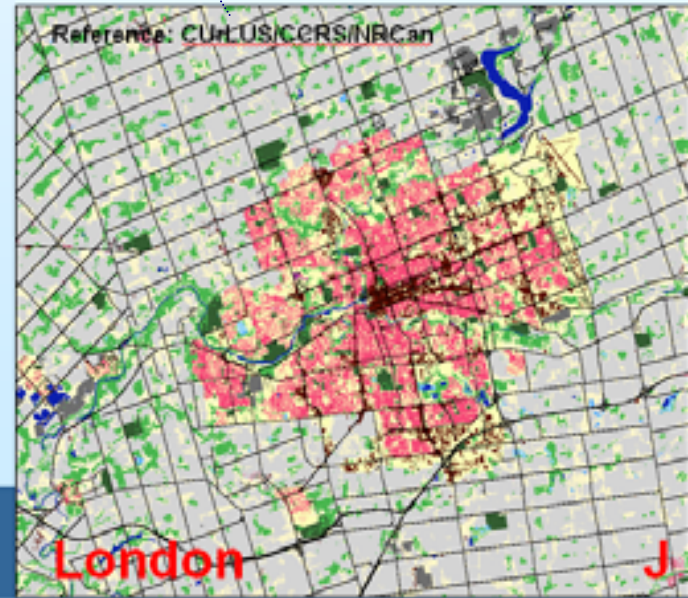
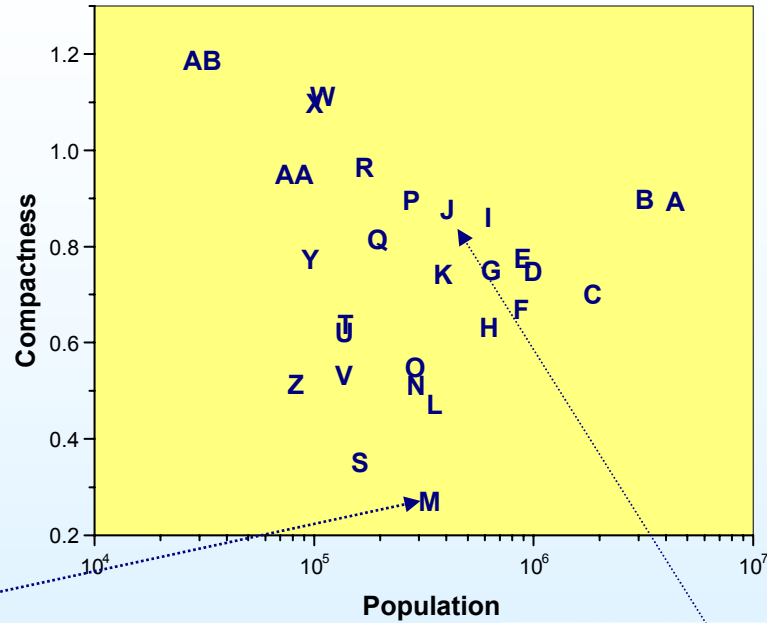
Travel Distance



Reference: CUrLUS/CCRS/NRCan

Application of CUrLUS to Urban Transportation II

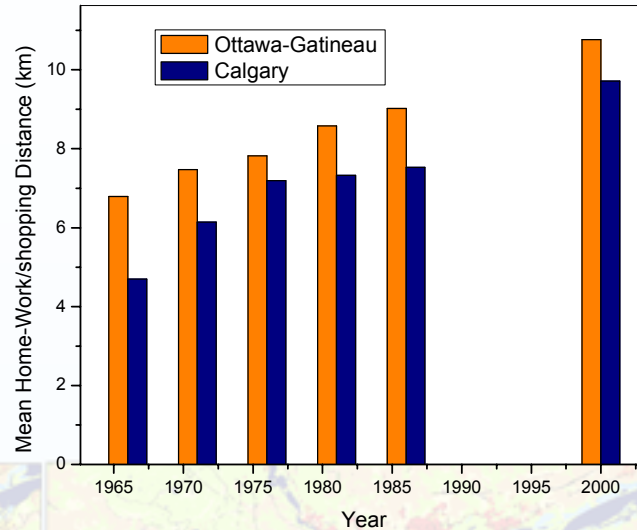
Urban Form Compactness Quantification



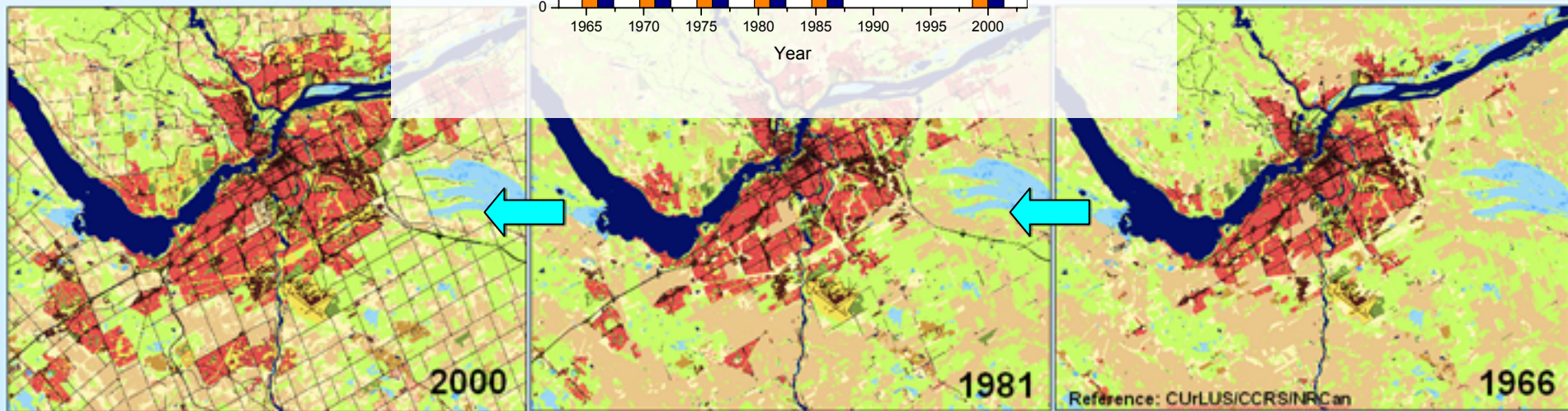
Application of CUrLUS to Urban Transportation IV

Linking Trends in Urban Growth and Commute Distance

Indicator: Urban Travel Distance (Model Simulation)

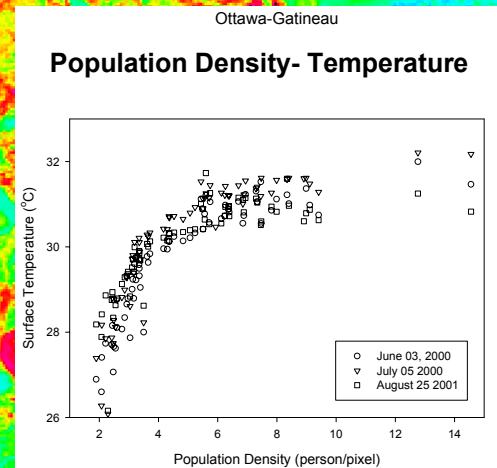
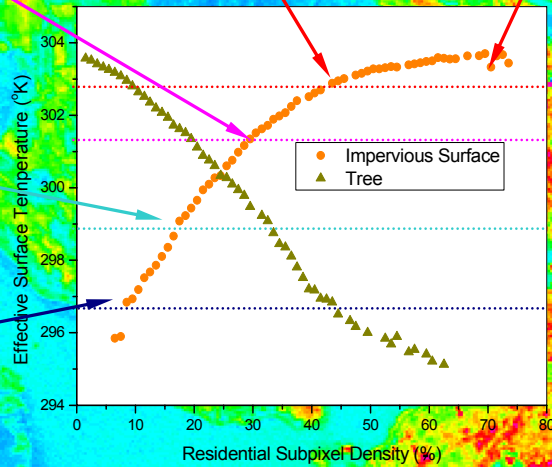
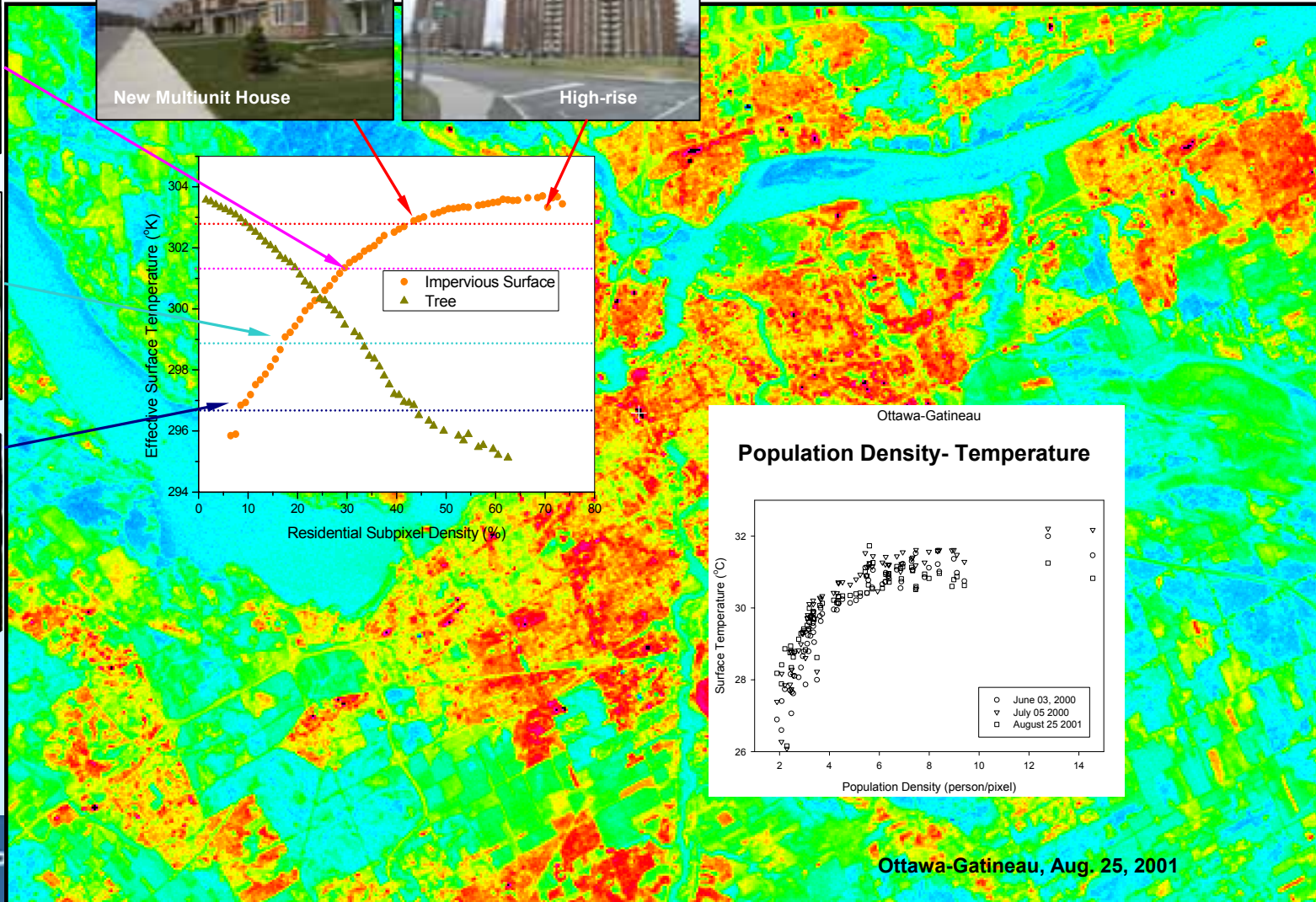
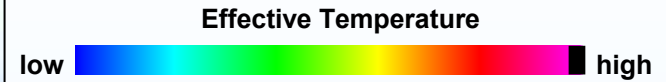


- Residential
- Commercial/Industrial
- Forest
- Agricultural
- Grass/Herbaceous
- Bare Rock/Sand
- Emergent Wetland
- Woody Wetland
- Transportation
- Urban Recreational
- Quarries/Dumps
- Water

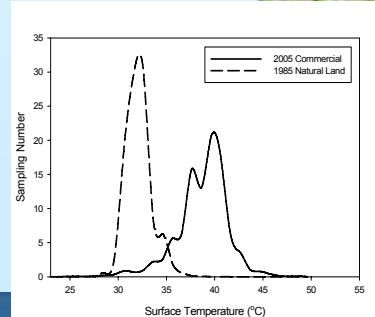
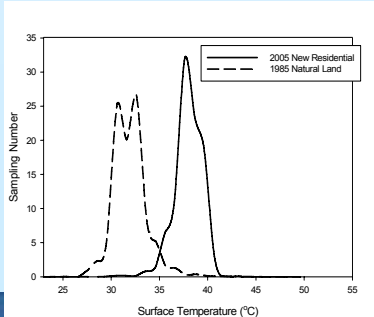
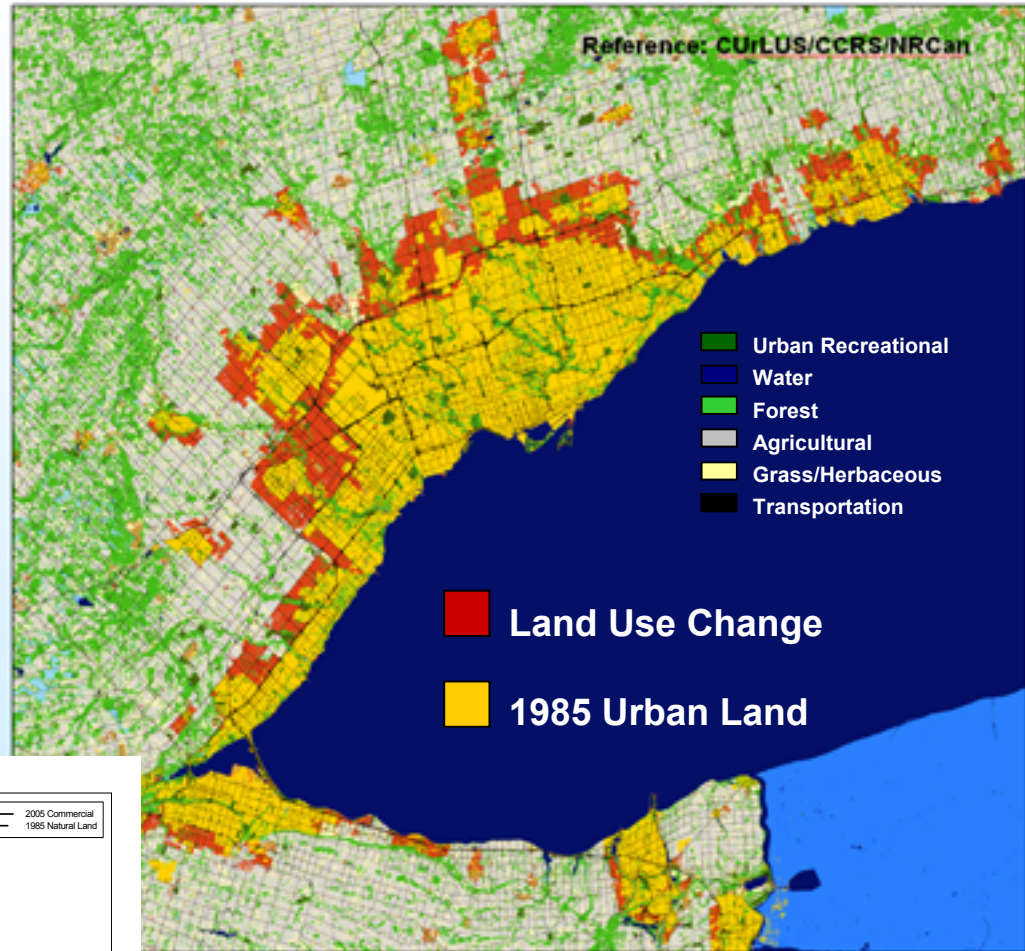
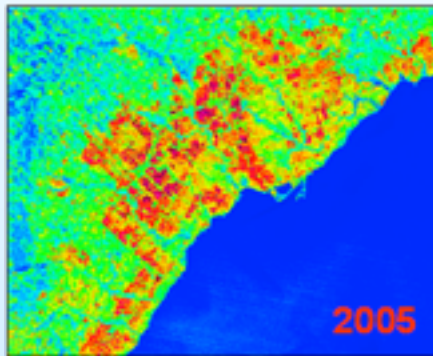
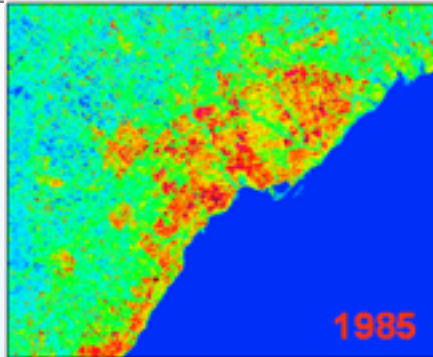


Application of CUrLUS to Urban Heat Island Study

Surface Temperature and Residential Land Density



Linking Trends of Urban Growth and the Surface Temperature Fields



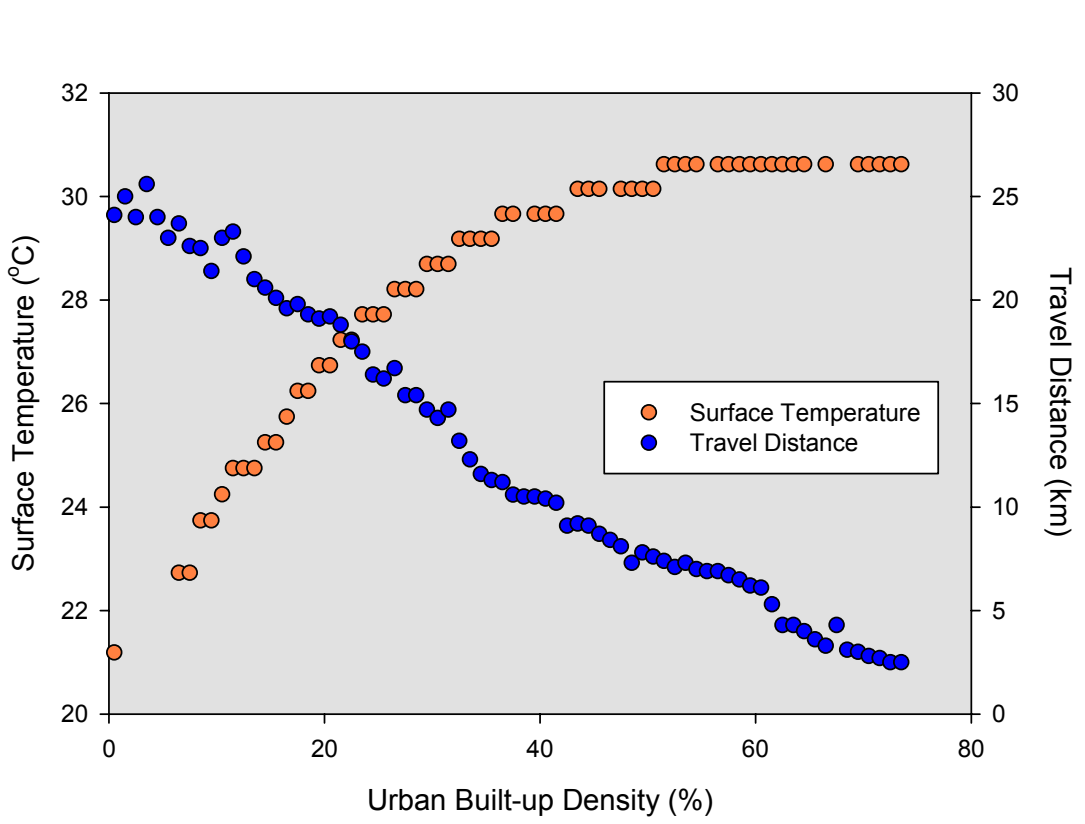
The Golden Horseshoe Region



Understanding Trade-offs in Sustainable Urban Development



Impacts on Environment



Compactness



An aerial photograph of a city, likely Vancouver, showing a large dam structure on the left side of a river. The city is densely packed with buildings and streets. The text "Thank You" is overlaid in the center of the image.

Thank You



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